3(1)

AUTHOR:

Zhevakin, S.A.

SOV/33-36-2-9/27

TITLE:

The Evaluation of Non-Adiabatic Stellar Pulsations by Use of

a Discrete Model

PERIODICAL: Astronomicheskiy zhurnal, 1959, Vol 36, Nr 2, pp 269-282 (USSR)

ABSTRACT:

The author develops a method for the calculation of radial non-adiabatic stellar pulsation with the aid of a discrete model of a stellar envelope. It is pointed out that this method requires much less calculation expenditure than the methods proposed by Woltjer / Ref 13, 14 / and Rosseland / Ref 17 / . The author formulates the conditions under which the new method is applicable. He constructs a discrete multilayer spherical model of a pulsating stellar envelope and investigates the equations of motion of this model. - There are 1 figure, and 40 references, 23 of which are Soviet, 9 English, 4 German, 3 Dutch, 1 Indian.

ASSOCIATION: Radiofizioheskiy institut Gor'kovskogo gos. universiteta imeni N.I.

Lobachevskogo (Radiophysical Institute at the Gor'kiy State Uni-

versity imeni N.I. Lobachevskiy)

SUBMITTED: February 10,1958

Card 1/1

3(1) AUTHOR:

Zhevakin, S.A.

SOV/33-36-3-2/29

TITLE:

On the Theory of Stellar Pulsations V (Spherical Discrete Model

of Several Layers)

PERIODICAL: Astronomicheskiy zhurnal, 1959, Vol 36, Nr 3, pp 394-409 (USSR)

ABSTRACT:

The present paper is a continuation of _Ref 12,3,2,28_7 and contains a theory of stellar pulsations. The author uses a spherical discrete model of several layers, where the change of the temperature gradient is considered for the appearing oscillations. Thereby an essential improvement of the qualitative results of [Ref 2] is obtained. The consideration of the longperiodic variable of the type RR Herculis and & Canis Majoris is new. The behavior of these stars corresponds well to the theory of the author. The most essential results are: If the envelope contains ca. 15 % helium and if there appears a radiative energy transfer in the zone of critical He II ionization, then in the envelope there appears a negative dissipation, sufficient for maintaining the oscillations of the star. The influence of the parameters of the stellar envelope on the amplitude and phase of

Card 1/2

On the Theory of Stellar Pulsations V (Spherical SOV/33-36-3-2/29 Discrete Model of Several Layers)

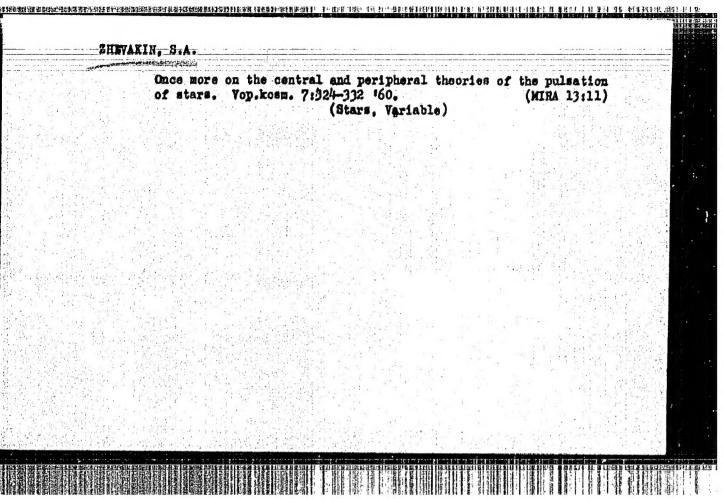
oscillations of the radiative flow from the star is investigated. The data of the parameter values corresponding to the single types of pulsation are improved.

There are 6 tables, 3 figures, and 32 references, 14 of which are Soviet, 4 German, 2 Dutch, 1 Canadian, 3 English, and 8 American.

ASSOCIATION: Radiofizicheskiy institut pri Gor'kovskogo gosudarstvennogo universiteta imeni N.I.Lobachevskogo (Radiophysical Institute at the Gor'kiy State University imeni N.I.Lobachevskiy)

SUBMITTED: May 19, 1958

Card 2/2



ZHEVAKIN, S.A.

Phase and amplitude variations of oscillations of the radiation flux passing through a nonadiabatic envelope of a pulsating star. Astron.shur. 37 no.3:443-457 Hy-Je '60. (MIRA 13:6)

1. Radiofizicheskiy institut Gor'kovskogo gosudarstvennogo universiteta imeni N.I. Lobachevskogo.
(Stars, Variable)

S/033/60/037/005/007/024 E032/E514

AUTHOR:

Zhevakin, S. A.

Dievakin, D. A.

On a Common Error in the Theory of Stellar Variability

PERIODICAL: Astronomicheskiy zhurnal, 1960, Vol.37, No.5,

pp. 842-847

In a number of papers attempting to explain the TEXT: existence of the phase difference between light variations and radius variations in pulsating stars, use is made of the analogy between this phase shift and the phase lag which occurs during the propagation of thermal waves through a non-pulsating medium. This analogy was first noted by Eddington and was later developed by The present author claims that he showed in Ref. 4 Rosseland. that this analogy is quite false. However, in recent years the analogy was employed by Cox and Whitney (Ref.5) and Cox (Ref.6) who derived various formulae from it and applied them to the theory of non-adiabatic pulsations of stars and used them in the "semi-empirical" derivation of the period-luminosity relation for classical Cepheids and Cepheids in globular clusters. The incorrect Rosseland-Cox-Whitney formula (Eq.1 of Ref.5) was also used by Wallerstein (Ref.7) in his calculation of the phase shift Card 1/3

Card 2/3

S/033/60/037/005/007/024 E032/E514

On a Common Error in the Theory of Stellar Variability

for the various models of the variables M5 No. 42 and W Virginis. The present paper develops the criticism given in Ref. 4 in greater It is shown that Rosseland's formula for the phase shift detail. for various stars, which is based on the above analogy, can lead, depending on the adopted stellar model, to a value of the phase shift which differs quite considerably from the true value. is due to the fact that the term pd/dt (1/P), which was neglected by Rosseland, is in fact of the same order of magnitude as the term (div F)/Q. It is also argued that the theory of nonadiabatic pulsations developed by Cox (Refs. 20 and 6) and Cox and Whitney (Ref. 5), although based on the correct idea, i.e. the assumption that the peripheral zone of critical ionization is responsible for the pulsations, contains fundamental errors and the majority of statements contained in these papers are incorrect. They will be discussed in greater detail in a future Reference is made to numerous publications by the publication. present author in which a correct treatment of this problem is There are 28 references: 20 Soviet and said to be given.

S/033/60/037/005/007/024 E032/E514

On a Common Error in the Theory of Stellar Variability 8 English.

ASSOCIATION: Radiofizicheskiy institut Gor'kovskogo gos. universiteta imeni N. I. Lobachevskogo

(Radiophysical Institute of the Gor'kiy State

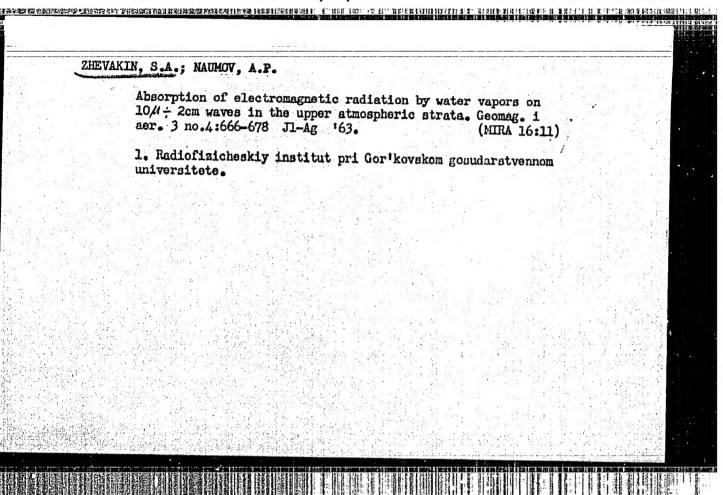
University imeni N. I. Lobachevskiy)

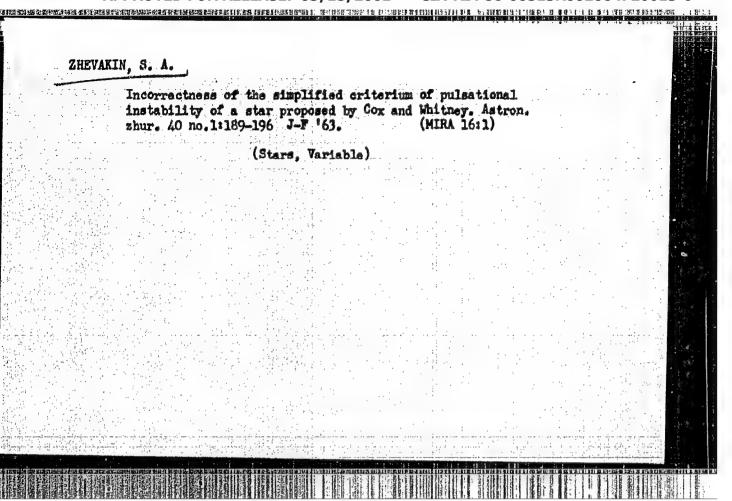
SUBMITTED: October 6, 1959

Card 3/3

ZHEVAKIN, S.A.; NAUMOV, A.P.

Coefficient of the absorption of electromagnetic waves by water vapor in the 10 4-2cm. band. Izv. vys. ucheb. zav.; radiofiz. 6 no.4:674-694 '63. (MIRA 16:12)





ACC NR: AR6016173	SOURCE CO	DE: UR/0058/65/000/	017/0015/0015	
AUTHOR: Zhevakin, 8. A	.; Strelkov, G. M.		38	
	the spectral line due to coll	isions	B	
SOURCE: Ref. zh. Fizik				
	po spektroskopii. AN SSSR,			
	ine, light scattering, kineti			7.5
ABSTRACT: It is shown	that an error has crept into spectral line in the well kno	the derivation of t on maner of Van-Vie	ck and Weiss-	
Lore For an idealized	model of the optical oscilla	tor the correct for	m of the	
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spectral line can be of the same spectral-line ism of the collision be	stained by the kinetic-equation shape under three different a stylen the outical oscillator	n method. This met ssumptions concerni and the molecules s	ng the mechan- urrounding 1t.	
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		ישו מגן ייט איט וישיו	00/011/1014/1014	
AUTHOR: Zhevakin, S.	A.; Naumov, A. P.	4	53	
WITE: Calculation of	rotational spectrum of water-	vapor molecules	B	
SOURCE: Ref. zh. Fizi	ka, Abs. 11D100			1.5
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TOPIC TAGS: molecular	Spectrum, water warms absent			
"Sanaram's emerged 44 TC Ci	onstant, optic transition, spec	etral line. Line v	absorption	
			_	
ABSTRACT: An electron	ic computer was used to calcula	te the absorption	coefficient in	
THE RESERVE THE PROPERTY OF TH	ic computer was used to calcula 32 cm and the dielectric const	mande d'es delles auseurs	4 6 6 .	
2 cm of water vapor wit	h account of 871 rotational to	ant in the range	from 0.1 mm to	
2 cm of water vapor with the direction cosines in terms with account of	th account of 871 rotational treatment of a rigid axiall	ant in the range ansitions. Matri y-symmetrical top	from 0.1 mm to x elements of , molecular	
2 cm of water vapor wit the direction cosines i terms with account of c Anderson theory, and a	th account of 871 rotational tropy the model of a rigid axiall centrifugal perturbation, line	ant in the range ansitions. Matri y-symmetrical top halfwidths calcul	from 0.1 mm to x elements of , molecular ated by the	
2 cm of water vapor wit the direction cosines i terms with account of a Anderson theory, and a tion were used in the	th account of 871 rotational transfer the model of a rigid axiall centrifugal perturbation, line spectral line shape obtained is alculations. The results of the second control of the results of the res	ant in the range ansitions. Matri y-symmetrical top halfwidths calcul rom solution of t	from 0.1 mm to x elements of , molecular ated by the	
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ACCESSION NR: AP4043666

\$/0109/64/009/008/1327/1337

AUTHOR: Zhevakin, S. A.; Naumov, A. P.

TITLE: Absorption of centimeter and millimeter waves by atmospheric water vapor

and strate and and training the best and the matter of the strategy of the st

SOURCE: Radiotekhnika i elektronika, v. 9, no. 8, 1964, 1327-1337

TOPIC TAGS: radio, radio communication, radio wave, radio wave absorption, radio wave atmospheric absorption

ABSTRACT: The coefficient of absorption of (0.7 mm - 32 cm) radio waves by atmospheric water vapor is computed on the basis of a kinetic equation developed by the authors earlier (IVUZ. Radiofizika, 1963, 6, 4, 674, and Geomagnetizm i aeronomiya, 1963, 3, 4, 666). The shape of the water spectral line determined from that equation is credited with a better agreement than Van-Vieck-Weisskopf's line shape with published experimental data, yet no complete

Card 1/2

ACCESSION NR: AP4043666

agreement between theory and experiment has been reached for the out-ofresonance range. For the 2-8-mm band, the discrepancy is 1.5 times, which is
better than the 3 times previously attained. "The authors take this opportunity to
thank A. I. Rakova and M. B. Flaksman for their help in processing the results."
Orig. art. has: 4 figures and 6 formulas.

ASSOCIATION: none

SUBMITTED: 28Feb63

ENCL: 00

SUB CODE: RC

NO REF SOV: 009

OTHER: 035

Card 2/2

FB/CW EWT(d)/EVT(1) L 11819-66 ACC NR. AP6002294 SOURCE CODE: UR/0141/65/008/006/1100/1109 AUTHOR: Zhevakin, S. A.; Naumov, A. P. ORG: Scientific Research Institute of Radio Physics at Corky University (Nauchnoissledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete) TITLE: Some problems in calculating and measuring the absorption of millimeter and submillimeter waves in atmospheric water vapor SOURCE: IVUZ. Radiofizika, v. 8, no. 6, 1965, 1100-1109 TOPIC TAGS: millimeter wave, submillimeter wave, radio wave absorption ABSTRACT: Theoretical values of the absorption factor v for a range of 10 w -- 32 cm were reported in recent of the authors'works (e.g., Rad. 1 elektronika, no. 9, p. 1327, 1964); measured values of * were 1.5--2 times higher than the theoretical for the 2-8-mm band and for the submillimeter ($\lambda \rightarrow 60 \text{ u}$) band. The present article examines the temperature of solar radiation attenuated by the Earth's "temperature the absorption factor of atmospheric water vapor, and the temperature of atmospheric radiation. It is preferable to measure the absorption in the submillimeter range by solar radiation than by atmospheric radiation, despite the fact that the solar-radiation method is applicable only when the antenna solar temperature is rather high and substantially varies with the zenith distance. Possible causes of the above discrepancy are briefly discussed in the light of current (196 4-65) Western publications. Orig. art. has: 5 figures and 2 formulas. 1931 SUB CODE: 17,09 / SUBM DATE: 14Hay65 / CRIM REF: 017 / OTH REF: 015 / ATD PRESS: 418 Card 1/1 HI UDC: 621.371.166.22

L 00861-66 EMG(J)/EMT(m)/EPF(c)/EMP(t)/EMP(b) LJP(c) JD

ACCESSION NR: AP5015860

UR/0109/65/010/006/0987/0996 3 621.371.166

AUTHOR: Zhevakin, S. A.; Naumov, A. P.

TITLE: Calculating the coefficient of absorption of centimeter and millimeter waves by the atmospheric pxygen 27

SCURCE: Radiotekhnika i elektronika, v. 10, no. 6, 1965, 987-996

TOPIC TAGS: wave absorption by oxygen, centimeter wave, millimeter wave

ABSTRACT: A review is presented of the published works on the coefficient of absorption of microwaves by oxygen. The coefficient of absorption is calculated for a 2-2 mm-10 cm band with a line form obtained by solving a sinetic equation. The discrepancy between the above results and the absorption herificient estimated with the (er neous van-view description in the line of the size of th

L 00861-66

ACCESSION NRI APSC15806

Under resonance conditions, within 56-64 Gc, the equivalent path depends on frequency considerably and can be as high as 8-21 km. "In conclusion, the authors wish to thank I. A. Rakova and M. B. Flaksman for their calculation work on a digital computer." Orig. art. has: 2 figures, 10 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 28 Feb. 64

ENCL: OO

SUB CODE: EC

NO REF SOV: 014

OTHER: 045

Card 2/2

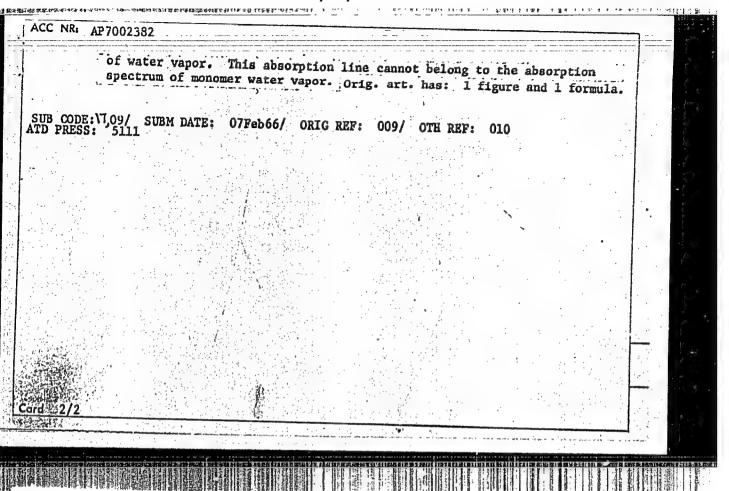
等性性或因為自然的不可能等不在法国经济的经历的经验在法国的经验的主义,但是对自己的主义的经验的证明,但,但是不可以是一个,但是一个人的人,也不是一个人的人,也不是一个人	C118:1
ACC, NR. AP6022069 AUTHOR: Zhevakin, S. A.; Naumov, A. P. ORG: Scientific-Research Institute of Radiophysics, Cor'kiy University (Nauchno-issledovatel'skiy radiofizicheskiy institute pri Gor'kovakom universitete) (Nauchno-issledovatel'skiy radiofizicheskiy institute pri Gor'kovakom universitete) TITLE: Absorption of 3—7.5-mm electromagnetic waves in the Earth atmosphero SCURCE: IVUZ. Radiofizika, v. 9, no. 3, 1966, 433-450 TOPIC TAGS: electromagnetic wave absorption, atmospheric absorption, atmospheric physics ABSTRACT: As the seasonal variations of absorption factors of 0, and H ₂ 0 and characteristic absorption altitudes are needed for many geophysical problems characteristic absorption altitudes are needed for many geophysical problems (including accurate weather prediction) and as this data is lacking in the available (including accurate weather prediction) and as this data is lacking in the available (including accurate weather prediction) and as this data is lacking in the available (including accurate weather prediction) and as this data is lacking in the available (including accurate weather prediction) and as same results of calculations made for winter literature, the present article offers some results of calculations of the total (40—100 Go). Out of 0, and H ₂ 0 resonance, the seasonal variations of the total absorption factor reach 30—40%. For higher altitudes, the H ₂ 0 centribution falls off absorption factor reach 30—40%. For higher altitudes substantially depend on monomers are: 1.56 km and 4.8 km (summer) or 1.48 km and 4.7 km (winter), respectively. The characteristic absorption factor and the altitude is the wavelength. The relation between the total absorption factor and the altitude is calculations on a BESM-2 computer and for her help in the data processing." Cord 1/2.	

C NR: AP6022069	[03]	
3 CODE:04, 08 / SUBM DATE: 18 Jun65 / ORIG REF: 020 / OTH REF: 017		
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2/21110		

"APPROVED FOR RELEASE: 03/15/2001

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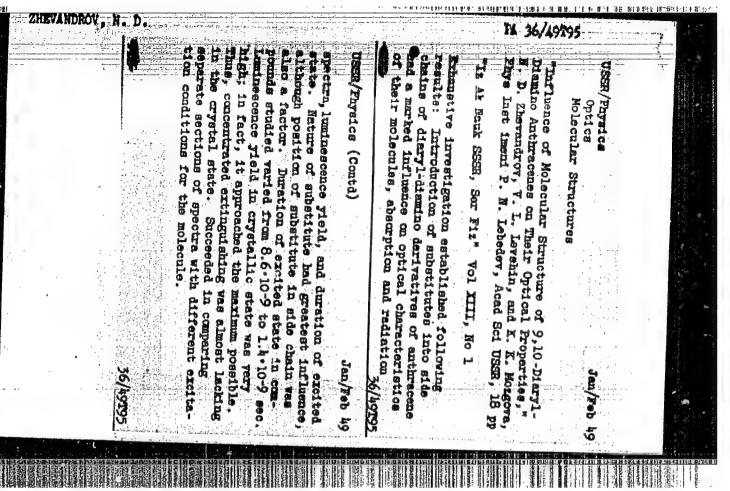
SOURCE CODE: UR/0020/66/171/005/1061/1004 AP7002382 ACC NRI AUTHOR: Viktorova, A. A.; Zhevakin, S. A. ORG: Scientific Research Institute of Radiophysics at Gor'kiy State University im. N. I. Lobachevskiy (Nauchno-issledovatel skiy radiofizicheskiy institut pri Cor'kovskom gosudarstvennom universitete) TITLE: Atmospheric absorption of microwaves by water vapor dimers SOURCE: AN SSSR. Doklady, v. 171, no. 5, 1966, 1061-1064 TOPIC TAGS: radio wave, radio transmission, radio wave absorption ABSTRACT: The author reviews the theory of microwave absorption by atmospheric gases and water vapor. Although measurements of microwave absorption by oxygen are in good agreement with those predicted, the results of measurements of water vapor absorption are about two times greater than theoretical values. Such a large discrepancy between measured and theoretical data cannot be explained by the presence of vapor isotopes or by an improperly chosen line breadth constant. The authors show that anomalous absorption by water vapor can be explained by the presence of dimer molecules of water vapor. Dimer absorption also explains the $(1/\lambda)ij = 49.5$ cm⁻¹ absorption line which is observed in the spectrograms 539.194:621.371.166.2 Card 1/2



ZHEVAKO, Vasiliy Trofinovich; GUSEVA, N.P., red.; ZIGBIN, M.V., tekhn. red. [My experience in fattening cattle] Moi opyt nagula krupnogo rogatogo skota, Alma-Ata, Kazakhskos gos. izd-vo, 1956, 8 p. (HIRA 11:7) 1. Pastukh nagul'nogo gurta kolkhoza "Torzhestvo truda". Zhana-Semeyskogo rayona, Semipalatinskoy oblasti (for Zhevako). (Kazakhstan--Cattle--Feeding and feeding stuffs)

"APPROVED FOR RELEASE: 03/15/2001

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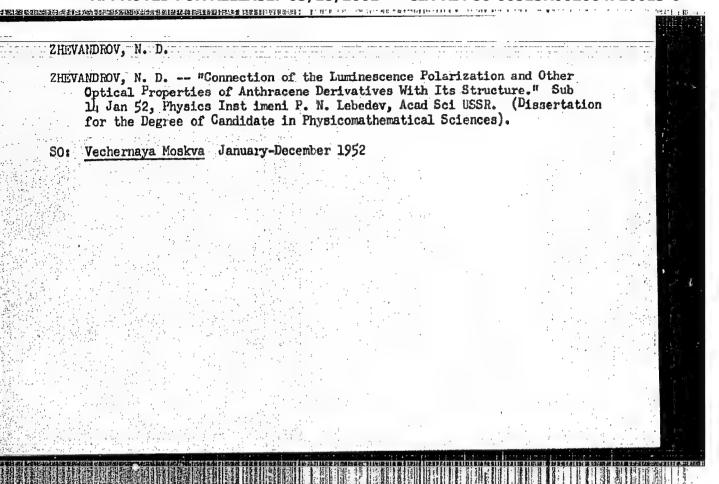
USER/Physics - Spectrum, Absorption 1 Sep 50
Anthracene

"Polarization Spectra of Anthracene Derivatives,"
N. D. Zhevandrov

"Dok Ak Nauk SSSR" Vol LXXIV, No 1, pp 25-28

Discusses polarization and absorption spectra of 10
arylamine deriv of an Albacane (9, 10-dichlorophenyldiamino anthracene, etc.) Tor wave lengths between 2,500
and 5,000 A. Submitted & Jul 50 by Acad & I. Vavilov.

174554



USSER/Physics - Fluorescence, Organic 11 Apr 52 USSER/Physics - Fluorescence of Organic Crystals," "Polarization of Fluorescence of Organic Crystals," N.D. Zhevandrov, Phys Instiment Lebedev, Acad Sciusor WESTR, Wolley Instiment Lebedev, Acad Sciusor USSER, Wollexill, No 5, pp 677-680 "Dok Ak Nauk SSSE" Vollexilli, No 5, pp 677-680 "Dok Ak Nauk SSSE" Vollexilli, No 5, pp 677-680 "Tavestigates 15 compds: anthracene and certain of the derive, mainly arylamine, derive of phthalymide, tarbasol, and silicic acid, Also investigates urany) sulfate, an inorg compd. Conducted control expts to def the depolarizing action of the apparatus; opti- cal system (Reichert's luminescent microscope and	USGR/Physics - Fluorescence, Organic 11 Apr 52 Crystals (Gontd) Gormu polarimeter constituted the main parts of app Acknowledges the helpful advice of his supervisor, Prof V. L. Levahin, and M. D. Galanin. Submitted by Acad A. W. Terenin 20 Feb 52. Acad A. W. Terenin 20 Feb 52.
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ZHEVANDROV, N.L.

Polarization (light) Fluorescence

Polarization of the fluorescence of organic crystals. Dokl. AN SSSR 83 No. 5., 1952.

Fizicheskiy Institut Im. P.N. Lebedeva Akademii Nauk SSSR rcd. 26 Nov. 1951.

Monthly List of Russian Accessions, Library of Congress, August 1952, Unclassified

K-5

ANDKOV

Category : USSR/Optics - Physical Optics

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4952

: Gribkov, V.I., Zheyandrov, N.D. Author

: Investigation of Polarization Characteristics of Luminescence of Complex Title

Organic Molecules by Photoelectric Methods.

Orig Pub : Dokl. AN SSSR, 1954, 98, No 4, 565-568

Abstract : Description of a photoelectric installation for the measurement of the degree of polarization of luminescence, analogous to that employed

earlier by L.A. Spektorov (Dokl AN SSSR, 1949, 65, 485). The light of the luminescence passes through a modulating device, consisting of bi-quartz and a stationary analyzer, and is incident on the photocathode of a multiplier, connected to an amplifier to a cathode-ray oscillograph. Measurements were made by compensating for the polarization with two rotating stacks of glass plates. The setup described was used to investigate the dependence of the degree of polarization of the luminescence on the wavelength of the exciting light (Polarization spectra) for viscous solutions of anthracene, phenanthrene, dixanthylene, dioxynaphthal-

dazine, 2-(oxyphenyl)-benzoxizde, and 3-aminophthalimide. Compardson

Card : 1/2

P.N. Lebeder Physics Inst.

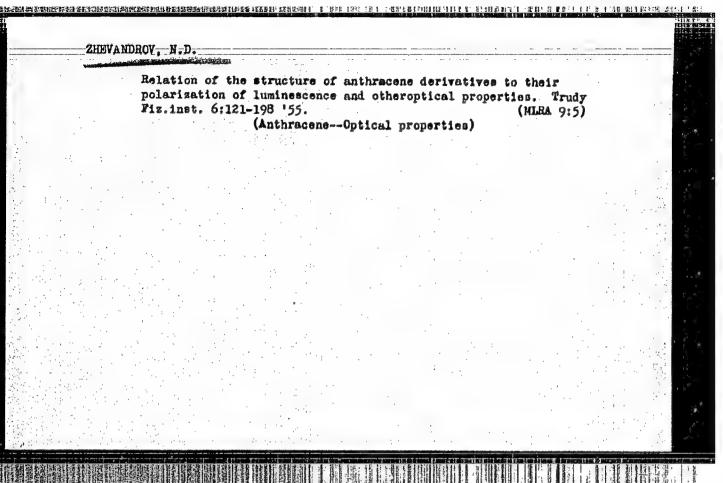
Category : USSR/Optics - Physical Optics

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4952

of the polarization spectra with the absorption spectra has led the authors to propose a hypothesis concerning the direction of the oscillators, responsible for the absorption and radiation of the light. Investigation of the dependence of the polarization of the luminescence on the temperature and on the viscosity of the solution and a fluoremetric determination of the duradium of the excited states have permitted the authors to calculate the effective volumes of the molecules of the investigated substances.

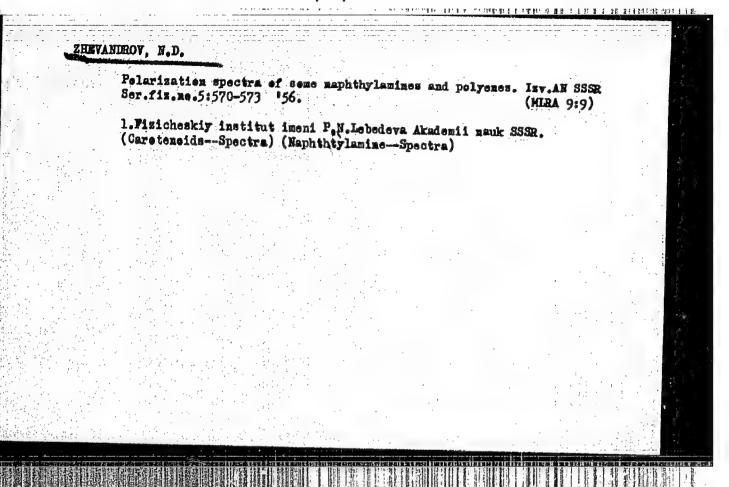
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ZhevANCROV, N.D. K-5 USSR/Optics - Physical Optics Referat Zhur - Fizika, No 5, 1957, 12945 Abs Jour Zhevandrov, N.D. Author Physics Institute, Academy of Sciences, USSR Inst. · Impte serie Effect of Migration of Energy on the Polarization of Title Fluorescence of Single Crystals : Dokl. AN SSSR, 1955, 100, No 3, 455-458 Orig Pub It is established that the polarization of fluorescence of organic single crystals is independent of the polariza-Abstract tion of the exciting light. It is explained by the migration of the energy of excitation in the crystal. It is shown that this independence is retained for various wevelengths of exciting light. The degree of polarization of the fluorescence in the case of natural excitation is also independent of the wavelength of the exciting light. . Card 1/2



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2HEYANDROY USSR/Physical Chemistry - Crystals

B-5

Abs Jour

: Referat Zhur - Khimiya, No 1, 1958, 245

Author

N.D. Zhevandrov.

Inst

Academy of Sciences of USSR

Title

: Polarization Graphs of Luminiscence of Molecular Mono-

crystals.

Orig Pub

Izv. AN SSSR, Ser. fiz. 1956, 20, No 5, 553-563

Abstract

: An attempt was made to determine the orientation of molecules in anthracene crystals by polarization spectra of its fluorescence. The results agree qualitatively with that of x-ray diffraction study.

Card 1/1

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AUTHOR TITLE

ZHEVANDROV N.D., NIKOLAYEV V.P.

On the Problem of the Determination of the Volumes of the Molecules in Solutions With the Aid of the Method of the Polarized Luminescence. (K voprosu ob opredelenii ob'yemov molekul v rastvorakh metodom polyarizirovannoy lyuminestsentsii.- Russian)

PERIODICAL

Doklady Akademii Nauk SSSR 1957, Vol 113, Nr 5, pp 1025-1028 (USSR).

ABSTRACT

The measurements of the polarization of the fluorescence of one and the same fluorescent substance in different solvents permits us to draw conclusions with regard to the existence and the character of the solvate covers. A solvate cover is the menomelecular layer of the solvent which surrounds the molecule of the solved substance and which has a more or less strong connection with it. The paper under review measures the polarization of the fluorescence with the aid of a KAVRAYSKIY-polaroscope with comp meating staple in the temperature interval between 20 and 60 degrees centigrade. In this interval the linearity of $1/p(T\eta)$ was vell confirmed. Here p stands for the degree of polarization, T for the temperature and η for the viscosity. In this temperature interval it was possible to use as solvents (which must have a sufficiently high viscosity) only glycerine, caster eil and vaseline oil. The concentration of the solutions amounted to 10^{-4} to 10^{-5} g/cm3. Three groups of fluorescent organic substances were investigated: Phtalimides, acridine

CARD 1/3

On the Problem of the Determination of the Volumes of the Molecules in the Solutions With the Aid of the Method of the Polarised Luminescence.

derivatives and anthracene derivatives, altogether nine substances. A diagram contains a clear representation of the dependence of the inverse degree of polarization (1/p) on (T/r)) for one of these substances. The obtained data are compiled in a chart. If we compute the mean radii r^* of the melecules with the aid of the known lengths of the bindings and of the structural formula, then we obtain the fellowing approximate estimate:

Substance r' in A

Phtalimides

Acridine

Anthracene 5

In the same way it is possible to estimate the dimensions of the molecules of the solvent. The effective volumes of the molecules of the different classes increase with growing complexity of the structure. It is not possible to explain unambiguously by the concept of the solvate cover the experimental results obtained. But there exists another possibility of interpreting these results, namely from the point of view of the difference between the macros-

CARD 2/3

20-5-22/67 On the Problem of the Determination of the Volumes of the Molecules in the Selutions With the Aid of the Method of the Pelarized Luminescence.

copic and the melecular viscosities. (1 repreduction, 1 chart)

ASSOCIATION: Institute of Physics "P.N. LEBEDEV", Academy of Sciences of the

USSR.

PRESENTED BY: A.N. TERENIN, Member of the Academy, 28.11. 1956

SUBMITTED: 23.11. 1956

AVAILABLE: Library of Congress.

CARD 3/3

20-6-17/48

AUTHORS:

Varfolomeyeva, V. N., Zhevandrov, N. D.

TIPLE:

Polarization Diagrams of the Laminescence of the Monocrystals of Stilbene (Polyarizatsionnyye diagrammy lyuminestsentsii mono-

kristallov stil'bena)

PERIODICAL:

Doklady AN SSSR, 1957, Vol. 115, Mr 6, pp. 1115 - 1118 (USSR)

ABSTRACT:

Investigations discussed here were carried out with spherical stilbene crystals. For the purpose of stimulating the luminescence in the center, the spheres were intersected in diagonal planes with a certain direction. The polarization diagrams were taken by a polarization-goniometric apparatus. First the dependence of polarization on the torsion angle of the crystal (round a horizontal axis) was measured at each hemisphere and then the positions of the crystal with such orientation was ascertained at which the polarization has the maximum positive or the maximum negative value. The stilbene monocrystals serving for the production of the samples were raised in soldered test-tubes according to the method of Obreimov-Shubnikov. The large monocrystals were divided into several

Card 1/3

smaller pieces. These spheres were intersected into

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20-6-17/48

Polarization Diagrams of the Luminescence of the Monocrystals of Stilbene

hemispheres in the following planes: I - in the plane of the optical axes. II - square with the bisector of the acute angle between the optical axes. III - square with the bisector of the obtuse angle between the optical axes. Then something is said on the theoretical computation of the azimuthal dependences and of the polarization diagrams of the luminescence. Then a sketch illustrates the computed positive and negative polarization diagrams for all of the three sections mentioned above. A second sketch contains the corresponding diagrams that have been measured by experiment. There is a good conformity qualitative of the corresponding diagrams. Because of this good qualitative conformity the determination of the orientation of the molecules in the crystal lattices of the polarization of the luminescence can be considered. That is, a new method for the determination of the structure of the crystal is obtained thereby. But the theoretical and experimental curves do not correspond quantitatively, maybe because of the influence of the temperature and the thermal oscillations of the molecules. There are 2 figures, 4 references, 3 of which are Slavic.

Card 2/3

20-6-17/48

Polarization Diagrams of the Luminescence of the Monocrystals of Stilbene

ASSOCIATION:

Physical Institute imeni P.N. Lebedev, AN USSR - Institute for

Crystallography, AN USSR

(Fizioheskiy institut imeni P.N. Lebedeva Akademii nauk SSSR,

Institut kristallografii Akademii nauk SSSR)

PRESENTED:

April 5, 1957, by A.V. Shubnikov, Academician

SUBMITTED:

March 27, 1957

AVAILABLE:

Library of Congress

Card 3/3

SOV/51-5-5-12/23

AUTHORS: Varfolomeyeva, V.N. and Zhevandrov, N.D.

TITLE:

Spatial Distribution of Polarization of Luminescence from Stilbene and Tolane Crystals (Prostranstvonnoye raspredeleniye polyarizatsii lyuminestsentsii kristallov stil bena i toluna)

PERIODICAL:Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 571-581 (USSR)

ABSTRACT:

In contrast to polarization in isotropic solutions, polarization of fluorescence of molecular crystals does not depend on anisotropy of excitation. The only spatial dependence of polarization in molecular crystals is the dependence on the angle between the direction of The graphical representation absorption and some other fixed direction. of this dependence is called a polarization diagram. The authors obtained polarization diagrams for luminescence of spherical crystals of stilbene and tolane. In order to excite a crystal only at the centre of the sphere, the spheres were cut in half along certain crystallographic planes and the plane of the cut was covered with a diaphragm so that only a small area of 1-2 mm diameter was excited at the centre of the sphere. The spheres themselves were from 5 to 10 mm in radius. The crystals were excited on the plane side and polarization of luminescence was measured on the spherical side.

Card 1/3

SOV/51-5-5-12/23

Spatial Distribution of Polarization of Luminescence from Stilbene and Tolane Crystals

Polarization diagrams were obtained using apparatus based on a goniometer and a Cornu polarimeter. Luminescence was excited using the 365 my Hg line. The hemispherical samples were prepared from stilbene and tolane monocrystals. The directions of the optical axes were found by the method described by Shubnikov (Ref 2) and these directions were used to prepare the samples in such a way that the hemispheres were cut along one of the following planes: (1) the plane of the optical axes, (2) the plane normal to the bisector of the acute angle between the optical axes, and (3) at right-angles to the bisector of the obtuse angle between the optical axes. Figs 1 and 7 show the coordinates used in calculation of polarization diagrams (Fig 1) and depolarization by thermal vibrations (Fig 7). give the calculated polarization diagrams for stilbene and tolane respectively. Figs 4 and 5 give the experimental polarization diagrams for stilbene and tolane respectively. Fig 6 gives the polarization diagrams calculated for the case of an oscillator oriented along the transverse axis of the stilbone molecule. The degree of polarization

Card 2/3

Spatial Distribution of Polarization of Luminescence from Stilbene and Tolane

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was also measured for certain other crystals such as anthracene which contained some naphthacene (Fig 8), 1,10-dibromounthracene and 3-dimethylamino-6-aminophthalimide at room temperature, and at the temperature of liquid nitrogen. Within the experimental error polarization is the same at both temperatures. Analysis of all the polarization diagrams shows that both localized and free excitons take part in the process of luminescence. The relative intensity and polarization for free excitons was obtained for anthracene, which contained naphthacene (Fig 9). There are 9 figures and 16 references, 9 of which are Soviet.

SUBMITTED; November 18, 1957

Oard 3/3

1. Stilbene orystals--Luminescence 2. Tolane crystals--Luminescence

3. Luminescence--Polarization 4. Mathematics

AUTHOR:

Znevandrov, N. D.

SOV/48-22-11-12/33

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TITLE:

Investigation of the Role Played by Localized and Free Excitons in the Luminescence of Molecular Crystals by Polarization Methods (Issledovaniye roli lokalizovannykn i svobodnykh eksitonov v lyuminestsentsii molekulyarnykh kristallov polyarizatsionnymi metodami)

PERIODICAL:

Izvestiya Akademii nauk CSGR, Seriya fizicheskaya, 1958, Vol 22, Nr 11, pp 1332-1336 (USSR)

ABSTRACT:

The author investigated the spatial distribution of the polarization of luminescence at a varying orientation of the crystals (so-called polarization diagrams). It proved indispensable to compute considerable correction factors for double refraction, which resulted in a considerable distortion of the actual polarization of luminescence. The information collected indicates that the corrected experimental curves and the curves calculated from X-ray analysis data take the same qualitative course, that they, however, do not agree quantitatively. When computing the polarization curves from X-ray analysis data it is assumed that the polarization of luminescence

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SOV/48-22-11-12/33

Investigation of the Role Played by Localized and Free Excitons in the Luminescence of Molecular Crystals by Polarization Methods

is exclusively dependent upon the symmetry of the molecules and upon their orientation in the lattice, that is to say, that the luminescence is caused by localized excitons. If, however, free excitons also participate in luminescence, the polarization of the total radiation will be different, because the transitions corresponding to the free excitons are polarized as the crystallographical axes. The degree of total polarization will decrease if the exciton polarization is oriented parallel to the crystallographical axis and it will increase if it is perpendicular to this axis. If this point of view is adopted the polarization curves can be used in the investigation of the role played by localized and free excitons in luminescence phenomena. By means of these curves it is possible to determine the axis directions in which the radiation of the free excitons is polarized and the relative intensity of this radiation. Using the relation between the degree of polarization of the total luminescence and the radiation of localized and free excitons it is possible to compute the intensity of the latter by employing the well-known formula for the addition of the

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 807/48-22-11-12/33

Investigation of the Role Played by Localized and Free Excitons in the Luminescence of Molecular Crystals by Polarization Methods

polarization degrees: $P = \sum_{i} I_{i}^{p} / \sum_{i} I_{i}$

The computation demonstrates that the radiation of localized excitons is responsable for 60-70% of the total luminescence. The two radiation components of free excitons ere polarized in the direction of the b and c' axes, each contributing 15-20% to the total luminescence. The intensity of the first component is somewhat in excess of the other. If the assumption due to Agranovich (Rer 9) is adopted that in activated crystals of a anthracene-naphthacene type the transfer of excitation energy from the intrinsic material to the impurity is effected by free excitons, then it may be expected that the relative radiation intensity of the localized excitons in the intrinsic material will increase. Hence the degree of polarization of the luminescence of the intrinsic material must increase with a higher concentration of the impurity. The experimental evidence confirmed this assumption. There are 4 figures and 10 references, 7 of which are Soviet.

Card 3/4

SOV/48-22-11-12/33 Investigation of the Role Played by Localized and Free Excitons in the Luminescence of Molecular Crystals by Polarization Methods

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedeva Akademii nauk SSSP. (Institute of Physics imeni P. N. Lebedev, AS USSR)

Card 4/4

的能量解离子。一类对的逐步时间的解决的形式的对象的特别是他们是他们的是全国的现在分别的第三人称单位的一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个 SOV/48-22-11-33/33 24(7) Zhevandrov, N. D., Galanin, M. D., Sevchenko, A. N. AUTHORS: Discussion of the Lectures Held by 4. M. Sarzhevskiv, A. N. TITLE: Sevchenko, and P. F. Nepochatykh (Preniya po dokladam A. M. Sarzhevskogo i A. N. Sevchenko: P. F. Nepochatykh) Izvestiya Akademii nauk SESR, Seriya fizicheskaya, 1958, Vol 22, PERTODICAL: Nr 11, pp 1420-1420 (USSR) N. D. Zhevandrov comments on the lecture by A. M. Sarzhevskiy ABSTRACT: and A. N. Sevchenko: The divergence between the molecular volumes determined experimentally can easy be explained, as the data presented in the respective papers were obtained after an interruption of three years and with different lots of glycerin. As regards the interpretation of the results with respect to the solvate shells or with respect to the macro- and microviscosity, this seems to be only hair-splitting, because the physical nature of the phenomenon is essentially that of the interaction of the fields of the dissolved molecules and of the solvent molecules. M. D. Galanin advances remarks concerning the above mentioned lectures: He criticises the application of Perren's formula to Card 1/2

SOV/48-22-11-33/33

Discussion of the Lectures Held by A. M. Sarzhevskiy, A. N. Sevchenko, and P. F. Nepochatykh

<mark>建等等的数量矩形使用压缩性用压缩运动的系统双键的形数性性相继的脑膜性神经的阻射体系数 网数国际性等制度</mark>增加 12、1968—1925~2015—2016年1985—2016年11日:12年27年12日 12年27年12日 12年37年12日 12年37年12日 12年37日 1

the determination of the molecular volume and in particular to a decision on the problem of the solvate shells. An agreement between the values of molecular volumes determined and the actual volumes of the molecules can only be expected to keep within the range of orders of magnitude. In this connection the results must be taken for an indication of the fact that microand macro-viscosity are about equal.

A. N. Sevchenko answers: The information provided gives rise to the assertion that the shape of the molecules in the solvent is approximately spherical. The fact that the solvate shell volumes found by independent methods (Perren, Marinesco, agree with each other may serve as direct proof or the accuracy of the respective methods. Hence the remarks by M. D. Galanin are not convincing.

Card 2/2 USCOMM-DG_60,863

DERKACHEVA, L.D.; ZHEVANDROV, N.D.; KHAN-MAGOMETOVA, Sh.D.

A fluorescence method for determining small quantities of bacteria [with summary in English]. Biofixika 4 no.1:117-119 Ja '59.

(MIRA 12:1)

1. Institut biologicheskoy fixiki AN SSSR, Moskva i Fizicheskiy institut im. P.N. Lebedeva AN SSSR, Moskva.

(BACTERIA,

determ. of small quantities by luminescent method (Rus))

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luminescent method of determ. of small quantities of bact. (Rus))

SOV/48-23-1-11/36

24(7) AUTHORS: Zhevandrov, N. D., Gribkov, V. I., Varfolomeyeva, V. N.

TITLE:

On the Polarization Dependence of the Fluorescence of Molecular Crystals on the Radiated Wave Length (O zavisimosti polyarizatsii fluorestsentsii molekulyarnykh kristallov

ot dliny volny izlucheniya)

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PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,

Vol 23, Nr 1, pp 57 - 61 (USSR)

ABSTRACT:

In a previous paper (Ref 1) the authors tried to explain the importance of free and localized excitons to the luminescence of molecular crystals. On the basis of the amount of the "ratio of polarization" (the ratio of intensity of the components according to the individual crystal axes) which greatly differs in free and localized excitons (Ref 3), both excitons can be identified by polarization. In the present paper the spectral dependence of the luminescence polarization of molecular crystals was investigated. At the same time, the degree of luminescence polarization and its intensity were measured. The investigation covered stilbene and anthracene. For stilbene, polarization is

Card 1/2

On the Polarization Dependence of the Fluorescence of Molecular Crystals on the Radiated Wave Length

SOV/48-23-1-11/36

almost constantly positive (+70%) within the long-wave range, whereas it becomes negative (-95%) within the shortwave range and at the end of the band. According to the results the authors arrived at the conclusion that shortwave luminescence with the polarization ~ -100% is determined by the free excitons, while long-wave luminescence depends on the localized excitons. The result of the determination of the short-wave spectrum by free excitons is in accordance with theory (Ref 6). In the case of anthracene, the polarization dependence of polarization on the wave length is somewhat more complicated. There is a marked polarization maximum within the short-wave range. At the end of the short-wave band the polarization declines rapidly down to 0, at low temperatures it remains somewhat higher. For investigating these problems it is necessary to clarify the orientation of crystals in detail and to pass to low temperatures. There are 4 figures and 11 references, 7 of

Card 2/2

8/051/60/008/02/030/036 E201/E391 On the Polarization of Luminescence of Zns Monocrystals Gribkov, V.I. and . Zhevandrov Optika i spektroskopiya, 1960, Vol 8, Nr 2, 24.7700 AUTHORS The paper reports an investigation of the polarization of luminescence of ZnS monocrystals activated with copper TITLE: of luminescence of the monocrystals activated with coperated by Ye.I. Panasyuk (Ref 1). Measurements of the degree of polarization were carried out using PERIODICAL: apparatus based on a microscope and a Cornu polarimeter apparatus passu on a microscope and a cornu potatimors. (Ref. 2). Some of the crystals were several mm in size so ABSTRACT they could be investigated without the use of a microscope. Measurements of the azimuthal dependence of polarization (i.e. dependence of the degree of polarization on the angle of rotation of the crystal about an axis perpendicular to its surface and coinciding With the direction in which the polarization is measured) makes it possible to find such orientation of the crystal for which the degree of polarization is greatest. this value agrees with Lempicki's work polarization was found to be roughly equal various samples; Card1/5 THE PARTY OF THE P

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On the Polarization of Luminescence of ZnS Monocrystals

(Ref 3). Moreover, both the azimuthal dependence and the maximum degree of polarization were found to be the same when luminescence was excited with different wavelengths. 436, 405, 365 and 313 mu. The absolute values of the positive and negative extrema of the azimuthal dependence should be the same. However, Lempicki's results (Ref 3) do not agree with this conclusion: on excitation with polarized light the negative extremum amounts to ~3% degree of polarization and the positive extremum is +20%; when crystals are excited with natural light the degree of polarization is D%. The cause of this behaviour is still not clear. It may be due to imperfections in the crystal or it may be the result of dependence of the polarization of luminescence on the polarization of exciting light. The present authors investigated dependence of the polarization of luminescence of ZnS monocrystals on the position of the electric vector in the exciting light. In this case the crystal was always oriented in the same way and a nicol was rotated about an appropriate axis (exciting light was

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On the Polarization of Luminescence of Zns Monocrystals 8/051/60/008/02/030/036

passed through this nicol). Figure 1 where the degree of polarization P is plotted against the angular position of the electric vector in the exciting light of the 365 mm wavelength. different orientations of the sample, two straight lines Were obtained indicating independence of the polarization of luminescence of the polarization of the exciting light. The degrees of polarization of luminescence of crystals excited with polarized light are the same as in the case when natural light is used to excite them. This seems to contradict Antonov-Romanovskiy's suggestion (Ref 4) that on excitation with polarized light only the centres of definite orientations are ionized and electrons can recombine only with such centres; the orientation of these centres is governed by the position of the electric vector of the exciting light. Consequently, the polarization of luminescence should, according to Antonov-Romanovskiy, depend on the polarization of excitation. However, if we allow for the fact that apart from migration of electrons there is also migration of holes (migration of

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On the Polarization of Luminescence of 201/E391 Monocrystals s/051/60/008/02/030/036

the state of ionization from centre to centre), we see there is no contradiction between Antonov-Romanovskiy's theory and experiment. Independence of the polarization of luminescence of ZnS monocrystals of the polarization of exciting light can be interpreted as due to migration of the excitation energy across the crystal. This still leaves the mechanism of such migration quite open: be an exciton mechanism or an electron-hole mechanism. Measurements of the degree of polarization along a luminescence spectrum showed that polarization is constant within the experimental error throughout the spectrum These measurements were carried out using apparatus consisting of a monochromator, a double-image prism and two photomultipliers recording two mutually perpendicular components of the electric vector of Qualitative observations indicated that afterglow has the same degree of polarization as luminescene

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On the Polarization of Luminescence of Zno Monocrystals

during excitation. Acknowledgment is made to
There are 2 figures and 4 references, 2 of which are

SUBMITTED: July 18, 1959

Card 5/5

\$/048/60/024/05/08/009 B006/B017

24.3500 AUTHORS:

Khan-Magometova, Sh. D., Zhevandrov, N. D., Gribkov, V.

TITLE:

The Effect of Beta Irradiation on the Photoluminescence of

Molecular Crystals

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,

Vol. 24, No. 5, pp. 561-566

The present article is a reproduction of a lecture delivered at the Eighth Conference on Luminescence (Minsk, October 19-24, 1959). The effect of intensity reduction of the photoluminescence of molecular crystals has already been clarified and investigated. Since one author could not observe this effect in beta irradiation of anthracene, while another author did, the authors of the present paper again carried out investigations on this subject and reported on their results. Crystals of pure anthracene and anthracene + naphthacene with different naphthacene concentrations were used for this purpose. The radioisotope

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The Effect of Beta Irradiation on the Photoluminescence of Molecular Crystals

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 $sr^{90} \longrightarrow r^{90}$ (25 mC and 100 mC, respectively, mean \$-energy 0.9 MeV, maximum β -energy 2.2 Mev) and H³ (0.37 and 3.4 curies, mean energy 5.5 kev, maximum 18 kev) with a maximum irradiation dose of 2.10 and (Sr⁹⁰) and 3.5·10¹⁰ rad (H³) served as a beta source. Several series were investigated of all samples, naphthene concentration was kept between 10^{-5} and $5 \cdot 10^{-3}$ g/g, photoluminescence was excited with $\lambda = 365$ m μ , and its spectrum was measured before and after beta irradiation. Irradiation lasted longer than 3-6 days. Single crystals, blocks containing single crystals, and pulverized samples were measured. Results are illustrated in diagrams. Irradiation of pure anthracene led to an appreciable reduction of the luminescence spectrum $(I_1/I_0=16\%)$. In a mixed crystal with g/g naphthacene $I_1^*/I_0^* = 71\%$, at a naphthacene content of 5.10^{-3} g/g the ratio attains 95%, i.e., luminescence is practically not reduced. Similar results were obtained by irradiation with a tritium source. Further investigations showed that this reduction is an irreversible

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The Effect of Beta Irradiation on the Photoluminescence of Molecular Crystals

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process and the result of a yield reduction. The fact that this effect is prevented by the presence of naphthacene impurities (which are often contained in anthracene) explains the different results of the investigations mentioned at the beginning. Two hypotheses are discussed for the purpose of explaining the affection of luminescence by irradiation: 1) formation of inactively absorbing non-luminescent molecules, and 2) formation of extinction centers capturing the excitons. Finally, experiments on irradiation with the strong H3 source and the resulting intensity reductions in luminescence of the samples are described

(Fig. 2 shows the luminescence spectra before and after the irradiation); also the spectral dependence of luminescence polarization before and after irradiation is investigated (Fig. 3) as well as the dependence of intensity reduction on the radiation dose (Fig. 4: with increasing dose I_1/I_0 shows an exponential drop). As may be seen from Fig. 3, irradiation has no influence on the shape of the spectrum, and only the intensity is reduced. In conclusion, the authors thank G. B. Radziyevskiy for his assistance. M. D. Galanin, Z. A. Chizhikova, I. Ya. Kucherov, and

Card 3/4

81281

The Effect of Beta Irradiation on the Photoluminescence of Molecular Crystals

APPROVED FOR RELEASE: 03/15/2001

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A. N. Faydysh are mentioned. There are 4 figures and 10 references: 3 Soviet and 6 British.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

Card 4/4

स्टर प्रविद्यालया । विश्व के प्रविद्या है के ब्राह्म के किया है की किया है की विश्व के में विश्व के प्रविद्याल स्टर्भ

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S/048/50/024/006/023/030/XX B013/B067

AUTHORS:

Gribkov, V. I., Zhevandrov, N. D., and Khan-Magometova, Sh.D.

TITLE:

Polarization Characteristics of the Luminescence of Molecular Crystals in Various Spectral Regions

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,

Vol. 24, No. 6, pp. 740-744

TEXT: This paper is a continuation of the studies of free and localized excitons in the luminescence of molecular crystals which were begun in Refs. 1 and 2. The spectropolarimetric, photoelectric apparatus described in Ref. 2 was used for the investigations. First, the authors measured the spectral dependence of polarization of the luminescence excited at various crystallographic planes (Fig. 1). Furthermore, the authors measured the dichroism spectra of the stilbene crystal plates investigated (Fig. 2). On the basis of the investigations it may be assumed that the strong change in polarization observed on the short-wave edge of the spectrum is not connected with the admixture of the exciting light.

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Polarization Characteristics of the Luminescence of Molecular Crystals in Various Spectral Regions

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Furthermore, the dichroism of reabsorption of luminescence must be taken into account. For the correction of the change in the actual polarization of luminescence due to the dichroism of reabsorption, well-known formulas derived by Förster (Ref. 3) may be used which have already been used for molecular single crystals. The spectral dependence of polarization on the edge of the luminescence spectrum is given in Fig. 3, taking account of the corresponding corrections. The strong change in polarization in spite of the correction indicates that the luminescence of the stilbene crystal shows the emission of free excitons. A study of the photo- and \$-excited (with Sr 90) polarization of luminescence has shown that the mechanism of luminescence does not depend on the nature of excitation and that the polarization of luminescence depends mainly on the properties of the crystal. The authors also studied the spectral dependence of polarization in compound anthracene and naphthacene Torystals. The results obtained for one of the naphthacene concentrations are given in Fig. 4. The change in polarization in the spectral region of anthracene is the same as that found for pure anthracene. In the spectral region of naphthacene, no

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Polarization Characteristics of the Luminescence of Molecular Crystals in Various Spectral Regions

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strong change may be observed in polarization. It may be assumed that the orientation of the naphthacene molecules in the lattice differs from that of the anthracene molecules. Fig. 5 gives the spectral dependence of the luminescence polarization of benzyl crystals at room temperature. Polarization increases in the direction of the short-wave edge, and attains 20% at the end of the spectrum. To determine a possible ellipticity, the polarization was analyzed by the ordinary method and by means of $\lambda/4$ plates (Ref. 9). Elliptical polarization could be observed neither in summational luminescence of the benzyl crystal nor in the individual sections of the spectrum, neither at room temperature nor at the temperature of liquid nitrogen. The same negative result was obtained in analyzing the summational luminescence of glycerin solutions of optically active substances - tryptophane and riboflavin. Hence, the elliptical polarization of luminescence of an optically active substance as described in Ref. 7 remains a single case. The present paper was read at the Eighth Conference on Luminescence (Molecular Luminescence and Luminescence Analysis) which took place in Minsk from October 19 to 24, 1959. There are 4 figures and 9 references: 5 Soviet, 3 German, and 1 Indian. Card 3/4

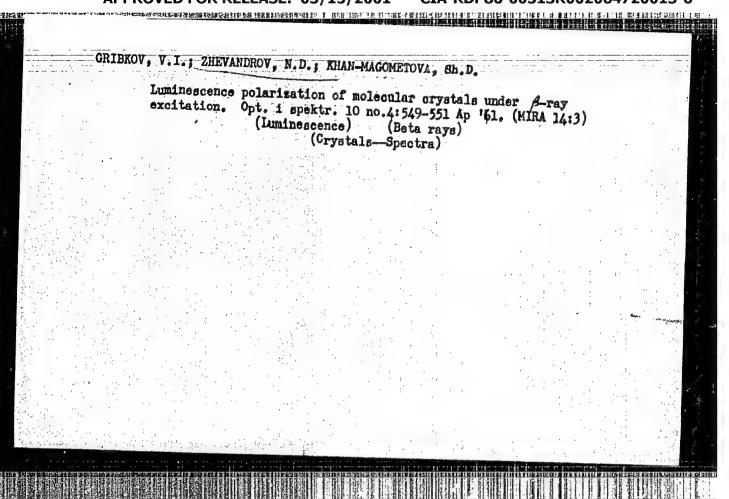
Polarization Characteristics of the Luminescence of Molecular Crystals in Various Spectral Regions

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ASSOCIATION:

Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences USSR)

Card 4/4



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\$/051/61/011/005/009/018 E202/E192

AUTHORS:

Zhevandrov, N.D., Gribkov, V.I., and

Khan-Magometova, I.D.

TITLE:

The influence of excitation light birefringence on the polarisation of the luminescence of the molecular

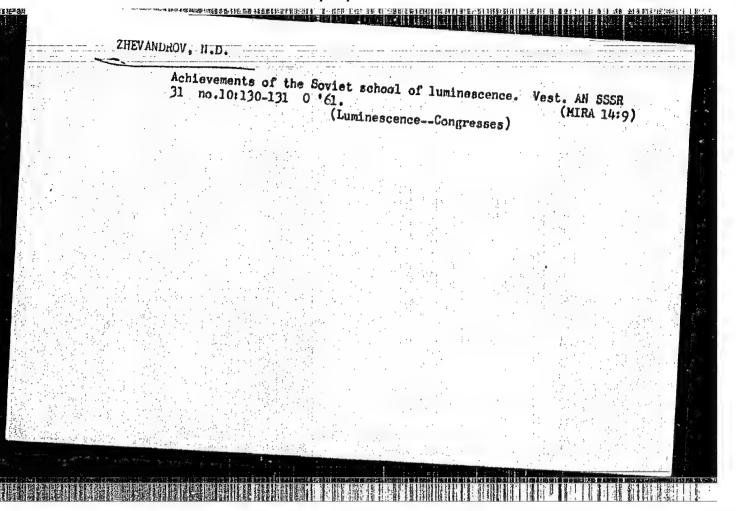
crystals.

PERIODICAL: Optika i spektroskopiya, v.11, no.5, 1961, 629-635

The authors have shown that in molecular crystals luminescence polarisation does not depend on the excited light polarisation. This independence is completely general, and exists in the presence or absence of other complicating factors such as double refraction, dichroism or optical activity. behaviour is explained by the migration of the energy of excitation in the crystals. In the case of double refraction, the electrical vector during its rotation will in turn coincide with the oscillators of various orientation causing a uniform excitation of the latter independent of the initial position of the exciting electrical vector. Stilbene crystal was selected for the spectro-polarimetric experimentation, which confirmed

Card 1/2

The influence of excitation light ... \$\frac{320\lambda{9}}{5/051/61/011/005/009/018} \text{ the independence of the luminescence polarisation of the exciting light polarisation. The object of the second experiment was to direct the exciting light along the optical saxis of the crystal. Single crystals of monoaxial benzyl, and biaxial stilbene were used, and again it was shown that in the polarisation of the exciting light. There are 6 figures, 1 table and 10 references: 8 Soviet-bloc and 2 non-Soviet-bloc. The English language reference reads as Ref. 9; G.S. Chandrasekhar. Proc. Ind. Acad. Sci., v.39, 243, SUBMITTED; December 26, 1960



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S/051/62/013/001/007/019 E039/E420

AUTHORS:

Zhevandrov, N.D., Gribkov, V.I., Khan-Magometova, Sh.D.

TITLE:

The migration of energy between impurity molecules in .

molecular crystals

PERIODICAL: Optika i spektroskopiya, v.13, no.1, 1962, 96-99

TEXT: It has previously been shown that the polarization of fluorescence of molecular crystals is independent of the position of the electric vector of the exciting light. This is made use of in the present paper to investigate the migration of energy between impurity molecules where the distances at small concentrations are many times the lattice constant. Measurements of polarization were made with a spectro-polarimetric photoelectric apparatus described in a previous paper. It is shown that for the largest investigated concentration of naphthalene in anthracene (10⁻³ g/g eq.) the degree of polarization of the luminescence does not depend on the position of the electric vector in the exciting light. From this it is concluded that migration of energy of excitation proceeds between Card 1/2

The migration of energy ... S/051/62/013/001/007/019

maphthalene molecules which are, on the average, a distance of lod apart (d is the lattice constant ~ 8 Å for anthracene). Measurements are also made on crystals of anthracene with the question of the migration being dependent on an inductive there are 5 figures and 1 table.

SUBMITTED: May 22, 1961

Card 2/2

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24,3500 (1137,1138,1144)

33430 \$/048/62/026/001/006/018 B125/B104

AUTHOR:

Zhevandrov, N. D.

^{1942年} 1945年 1958年 195

TITLE:

Studies of activation energy migration in molecular crystals with the aid of luminescence polarization

PERIODICAL:

Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 1, 1962, 67-73

TEXT: The polarization techniques of S. I. Vavilov et al. (limiting polarization, polarization diagram, polarization spectra) give valuable information on the structure and properties of emitters and also on their A. F. Prikhot'ko, V. L. Broude et al. at Kiyev have confirmed important developed by Davydov and associates. These results include the Davydov light absorption, and the strong effect of lattice defects on luminescence. The multipole properties of elementary emitters can be Gard 1/3

33430

Studies of activation energy ... s/048/62/026/001/006/018 B125/B104

tion of luminescence polarization. A goniometric polarization device has now been used to examine the spatial distribution of luminescence polarization of anthracene, anthracene + naphthanene, stilbene, and tolane. Polarization diagrams can be calculated for every direction of a single crystal if, e. g., X-ray structural data on the crientation of molecules in the lattice of these crystals are used, and if the position of the radiation oscillator in the molecule is known. The experimentally calculated degree of polarization is always less than the theoretical value. The basic features of the model of the oriented gas are probably valid. According to experiments on single crystals of numerous substances, the luminescence polarization is often independent of the position of the exciting electric vector, owing to intermolecular energy migration in the crystal. With the aid of a technique specially developed by the author it could be proved that in crystals with a high concentration of luminescent admixture (anthracene or naphthacene), energy migrates up to concentrations of 6.10^{-5} g/g, which corresponds to a mean distance of 26 d (= 208 Å, d = lattice constant). The migration of holes in the lattice explains the author's observation that, like in

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Studies of activation energy ...

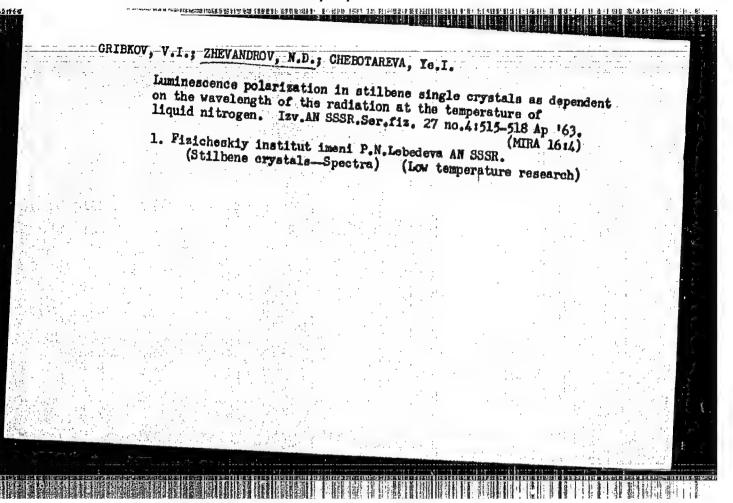
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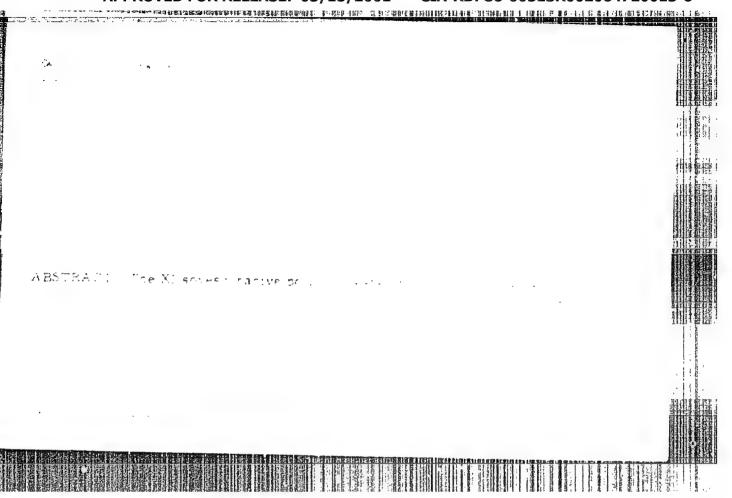
molecular crystals, the luminescence polarization of ZnS single crystals is independent of the polarization of the exciting light. The luminescence polarization of molecular crystals is also independent of the exciting light. In beta excitation, free excitons photoluminescence of molecular crystals less than in the case of polarization techniques described here has indicated that the model of in first approximation, i. e., the luminescence of molecular crystals Migration of energy takes place between pure and mixed crystals, and free excitons participate in the luminescence of molecular crystals. There

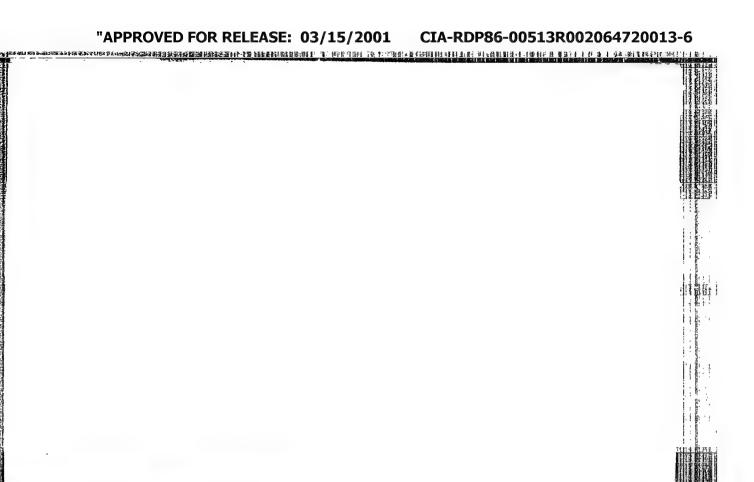
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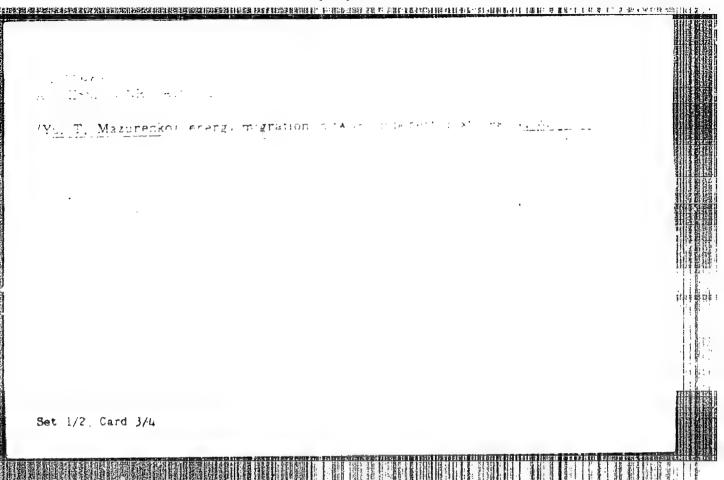
Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

Card 3/3









L 10773-63

ACCESSION NR: AP3002797

(M. M. Val'dman and G. D. Sheremet'yev): use of isoparaffin to produce sharp spectral alora and metryloapt tosleness (7) the metryloapt tosleness (7) the metryloapt tosleness (8) the metryloapt tosleness (9) the

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ASSOCIATION: none

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For Complete Set See: 11th Conference on Luminescence

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ACCESSION NR: AP3002797

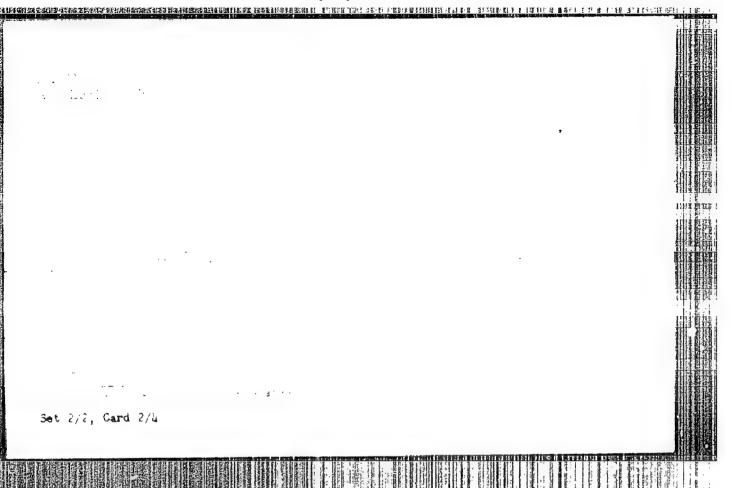
AUTHOR: Ourinovich, G. P.; Zhevandrov, W. D.; Solov'yev, M. M.

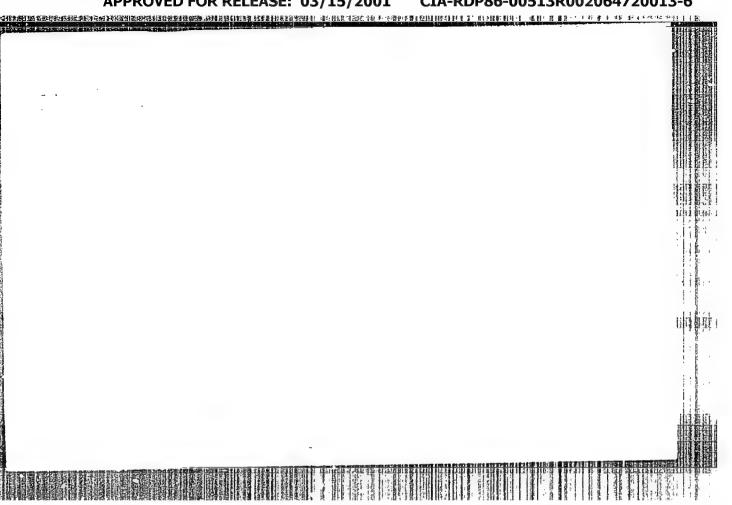
TITIE: 11th Conference on Laminescence (Held at Minek, 10-15 September 1962)

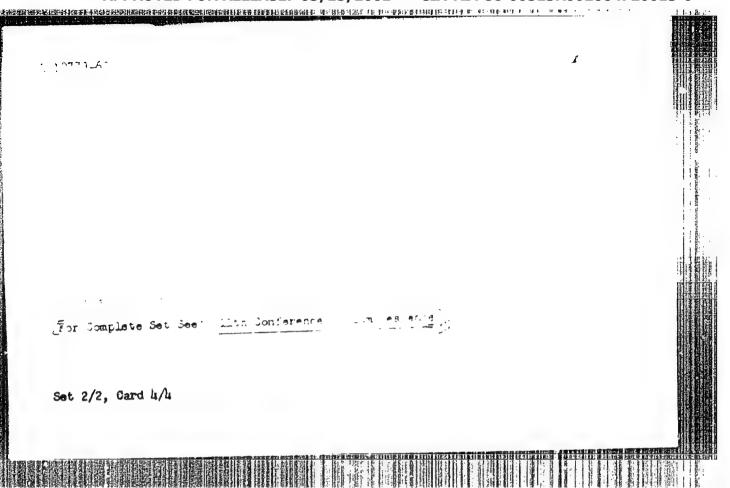
SOURCE: Optika i spektroekopiya, v. 14, no. 5, 1963, 835-838

TOPIC TAGS: molecular luminescence, etimulated emission, triple: state, laser

IRSTRICT: VI. LUMINESCENCE OF ORGANIC VAPORG: avoiced states in the data thase







19952-63 EWA(k)/EMP(k)/EMP(q)/EMT(m)/BD3/T-2/EEC(b)-2/ES(t)-2--AFFTC/ASD/ESD-3/RADC/APGC/AFWL/IJP(C)/3W2--Pf-4/P1-4/Pq-4--GG/WH/JHB/WG/K ACCESSION NR: AP3006795 \$/0053/63/080/004/0685/0701 AUTHOR: Gurinovich, G. P.; Zhevandrov, N. D.; Solov"yev. Marchael States and American TITLE: 11th Conference on Luminescence (Molecular luminescence and luminescence analysis) [Minsk, 10-15 Sep 1962] SOURCE: Uspekhi fizicheskikh nauk, v. 80, no. 4, 1963, 685-701 TOPIC TAGS: laser research, laser resonant cavity, luminoscence, inorganic laser material, luminescence conference, laser oscillation condition, molecular crystal laser, ruby laser, glass neodymium laser, Mossbauer effect, organic laser material, triplet state, chlorophyll luminescence, albumen luminescence, lumines cence research ABSTRACT: The XI Soveshchaniye po lyuminestsentsii (11th Conference on Luminescence) was held 10-15 September 1962 in Minsk. More than 370 participants took part, and more than 180 reports were presented. Considerable attention was paid to lasers. A scries of theoretical works concerning the properties of absorption and emission at high radiation intensities and the theory of Card 1/6

L 19952-63 ACCESSION NR: AP3006795

a resonator in which an active substance is placed yere presented by the Institut fiziki AN BSSR (Institute of Physics, AN BSSR). P. A. Apanasevich in his report on the dependence of absorption, emission, and scattering of radiation on the intensity of incident radiation gave the derivation by the method of quantum electrodynamics of the dependence of absorption and dependence of scat-tering and photo-luminescence characteristics on the spectral composition and intensity of incident nonmonochromatic radiation absorbed by the medium and on the probability of ponoptical transitions. In the report of G. S. Kruglik and P. A. Apanasevich on the problem of coherent spontaneous emission, the conditions under which coherent spontaneous emission with an intensity proportional to the square of the number of emitted particles were discussed, and it was shown that under general conditions such emission is impossible. The report of V. P. Gribkovskiy on forced anisotropy of the absorption coefficient was devoted to properties of the absorption coefficient at high intensities, and it was shown that the absorption coefficients of a linearly polarized or a natural light coincide with absorption coefficients of isotropic radiation

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only at low or very high intensities. The report of B. I. Stepanov and coworkers on the oscillation of an inorganic plane-parallel layer dealt with the theory of laser resonators. Results of the solution of transport equations and Maxwell equations for inorganic layers with a negative absorption coefficient in the absence of outside radiation were given. The conditions for a stationary oscillation were obtained; by calculating the nonlinear dependence of the absorption coefficient on the radiation density, the values. for density and energy release inside the layer under conditions of stationary oscillation were determined. The conditions for flows of different directions and frequencies were investigated. In the work of B. I. Stepanov, A. M. Samson, and Yu. I. Chekalinskaya on the effect of noises on the oscillation of a bounded plane-parallel layer, the light field inside and outside the resonator in the presence of noises was discussed. In the report of Khapalyuk on the possibility of generation of radiation by a system of plane-parallel plates, self-luminescence of a pile of plane-parallel plates with positive as well as negative absorption coefficients was analyzed. The report of B. I. Stepanov, A. M.

Card 3/6

新沙拉斯 俄利亚伊朗拉特 海绵 生物经过中的形态 网络黑色的 全国证据 他们全球的关系是 15至8日的 在美国的共和国的职机的一位,但是由于1957年,1957年1957年,1957年1957年,1957年 L 19952-69 ... ACCESSION NR: AP3006795 Samson, and V. P. Gribkovskiy on the effect of characteristics of a substance on the properties of generated radiation was concerned with properties of an active substance inside the resonator. The pump power, absorption, luminescence, and the power and oscillation threshold of a plane-parallel layer with three energy levels were calculated. In the work of V. L. Broude, V. S. Mashkevich, A. F. Prikhot'ko, N. F. Prokopyuk, and M. S. Soskin on induced radiation in molecular crystals, a four-level scheme for a quantum generator was discussed. It was shown that optical properties of molecular crystals provide a basis for the realization of a quantum generator. In the report of A. M. Samson and V. A. Savva on nonstationary luminescence of an oscillating plane-parallel layer, laser luminescence kinetics were discussed. In the report of M. D. Galinin, A. M. Leontovich, E. A. Sviridenkov, V. N. Smorchkov, and Z. A. Chizhikova on radiation properties of a ruby crystal laser, the kinetics of generation at room temperature and low temperature (down to -1650) and properties of radiation coherence in a ruby laser were investigated. The report of A. M. Bonch+Bruyevich, V. V. Wargin, Ya. A. Imas, C. O. Karapetyan, Ya. E. Karis, Card 4/6

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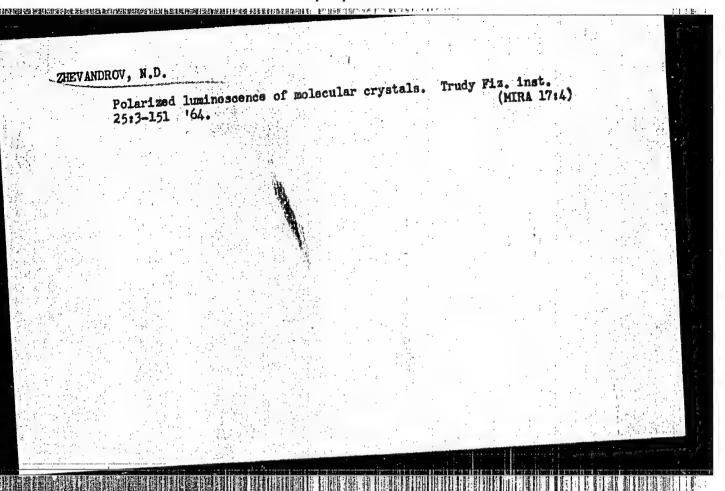
L 19952-63 ACCESSION NR: AP3006795

Card 5/6

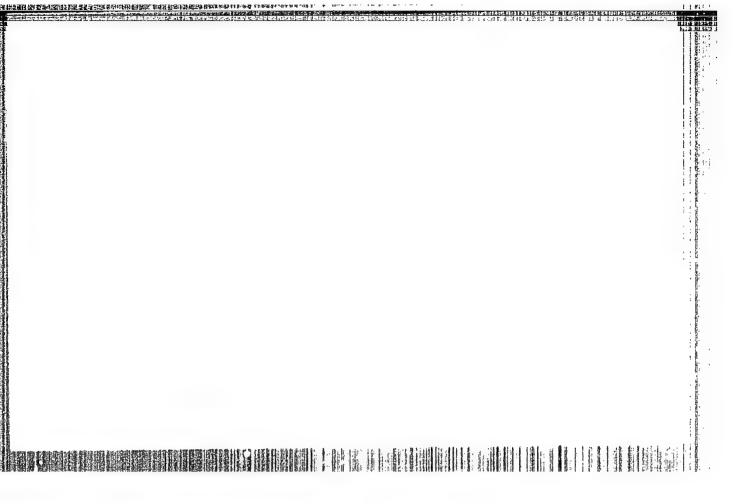
Tolstoy, and P. P. Feofilov on luminescence and induced radiation of a glass activated by neodymium discussed absorption and luminescence spectra of glass containing 0.1-10% neodymium. 5 Stimulated emission in the region of 1.06 u, observed in specimens, was investigated at room and nitrogen temperatures. K. K. Rebane and V. V. Khizhnyakov in their report presented results from theoretical investigations of the Mössbauer effect.) The authors succeeded in discovering an analogy between Shpol'skiy's effect, electron-vibra-tional transitions in impurity centers of ionic crystals, and the Mössbauer effect. A new version of the theory of diffusion quenching of fluorescence in a solution by means of foreign substances was offered in the report of B. Ya. Sveshnikov (deceased), A. S. Selivanenko, V. I. Shirokov, and L. A. Kiyanskaya. Other reports presented during the conference on molecular luminescence can be grouped as follows: theory of molecular luminescence; luminescence of molecular crystals; quasi-line spectra of frozen solutions; yield and quenching of luminescence of solutions; luminescence of vapors of organic compounds; the influence of the association of molecules,

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ACCESSION NR: the solvent, and other physicochemical factors on luminescence; triplet states; luminescence of chlorophyll, albumons, and other important biological compounds; molecular luminescence of inorganic compounds; and molecular luminescence and chemical problems (relationship between luminescence and molecular structure, chemiluminescence, etc.). Reports on luminescence analysis can be grouped as follows: luminescence analysis in chemistry; luminescence analysis in biology, medicine, microbiology, and veterinary medicine; luminescence analysis in technology, industry, and geology; and instruments and methods of luminescence analysis. ASSOCIATION: none 305ep63 DATE ACQ: SUBMITTED: NO REF SOV: SUB CODE: Card 6/6



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VREDEN-KOEETSKAYA, T.O.; GEORGOBIANI, A.N.; GCILIBEVA, N.P.;
CRICOR'YEV, N.N.; ZHEVANDROV, N.D.; MORGENSHTERN, Z.L.;
PETUKHOVA, M.S.; TABIHOVICH, N.Ta.; TOK, M.V.;
KHAN-MACOMETOVA, Sh.D.; ANTONOV-ROMANOVSKIY, V.V., doktor
fiz.-mat. nauk, otv. red.

[Luminescence; a bibliographic index for 1947-1961] Liuminestsentsiia; bibliograficheskii ukazatel', 1947-1961.
Moskva, Nauka, Vol.2. 1964. 378 p. (MIRA 18:4)

1. Akademiya nauk SSSR. Sekter seti spetsial'nykh bibliotek.

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